

# AI-based Railway Shield

**An Innovative Approach to Railway Safety**

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# Problem Statement

8 accidents reported in the first five months of 2024-25 alone.

As we see in India there is large problem of crack in track and because of unawareness about crack train passes through it and causes a large accident and many people loose their life .

Delayed detection of broken tracks leading to high risk of accidents and derailments.

- Inefficient energy usage in railway operations.
- Ineffective track management and alert systems.



# Problem Statement

In 2023 approx five hundred people die because of this and my model will save such life . ☒ My project is to solve most common problem of India at railway station. ☒ Major problem of crack in track which cause a large accident is been solve by my project.



# Impact of Accidents

- **Human and Economic Impact:**
  - – **Loss of lives and severe injuries.**
  - – **Economic losses due to disrupted railway operations.**
  - – **Emotional and psychological impact on victims and their families.**



# Impact of Accidents



Such accident happened in Bihar at Buxar where many people lost their life



Happen in Uttar Pradesh



# Impact of Accidents



## **Warning**

Contains video some  
may find distressing

# Project Goals

## Primary Objectives:

- Detect broken railway tracks promptly using advanced sensors.
- Alert the nearest control room and railway web server to initiate immediate preventive actions.
- Convert ambient sound energy into electrical energy to power the system and save costs.
- Improve overall track management and safety.



# Technical Approach

## **Technology Used:**

- Node MCU: Acts as the IoT device for data collection and transmission.**
- Sensors: Various sensors to detect anomalies in the tracks and convert sound to energy.**
- AI Algorithms: Real-time monitoring and analysis to identify potential breaks and alert the control room.**
- Railway Web Server: Developed to receive alerts and manage responses efficiently.**





# Working

The working of our model is in this way –

- 1.If anywhere track will be broken then message will be sent to nearest control room and also at WEB SERVER so they will be aware about this and as soon as possible they change the route of train and repair the track .



# Alert Mechanism

The third working of my model is to avoid accident of people with train as we that many people cross platform through track which cause accident so using ultrasonic sensor I have given solution of this



# Alert Mechanism

## Alert Process:

- AI triggers an alert to the railway web server and the nearest control room upon detecting track anomalies.
  - Control room informs the station master or officer.
- Immediate preventive actions include alerting incoming trains and initiating track repairs.



# Benefits

## **Advantages of the System:**

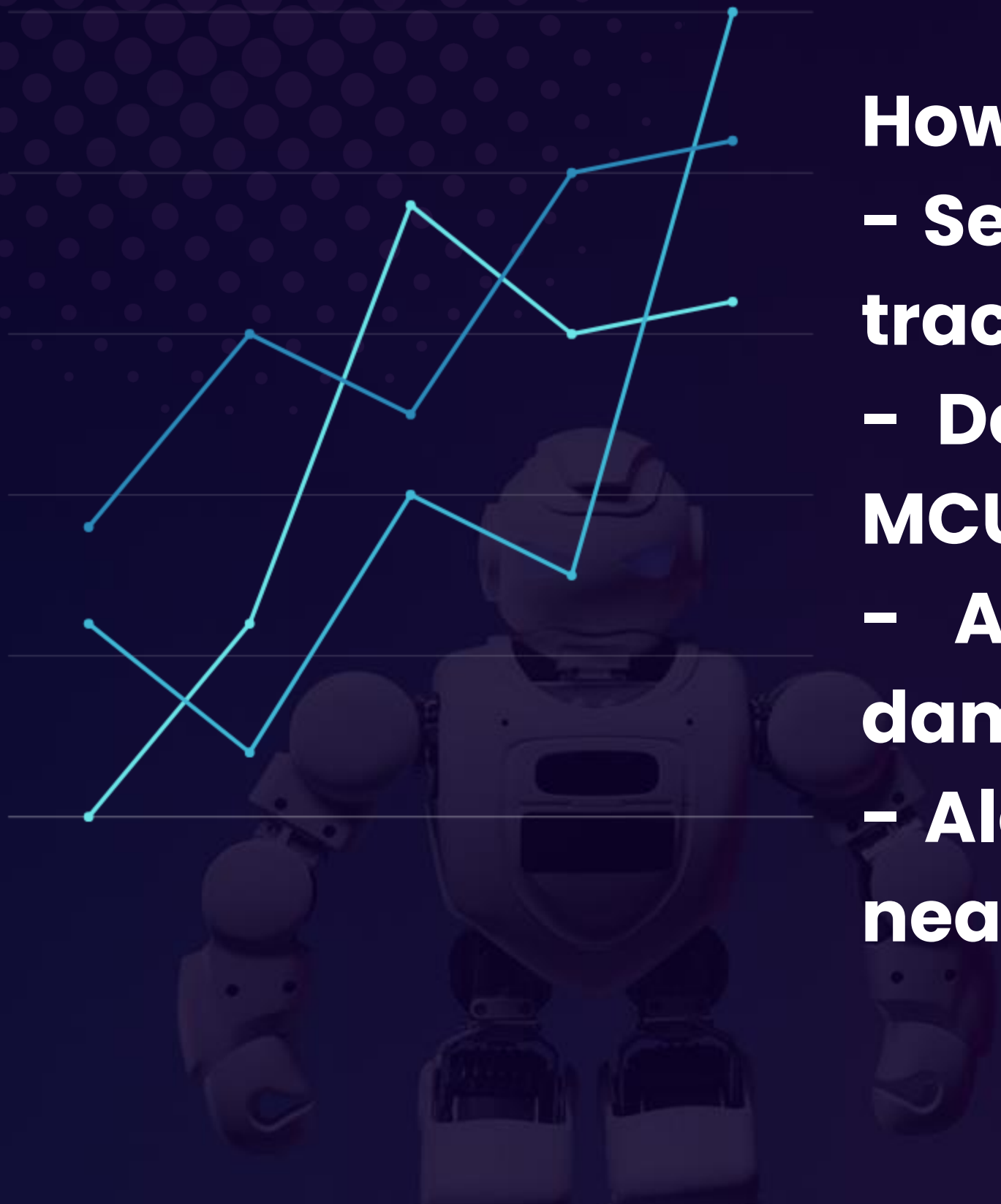
- **– Enhanced railway safety and reduced risk of accidents.**
- **No accident will happen by using this project**
- **– Efficient energy use and cost savings through sound energy conversion.**
- **– Real-time monitoring and quick response to potential hazards.**
- **– Improved track management and safety through the railway web server.**



# Detection System

## How It Works:

- **Sensors detect physical anomalies in the railway tracks.**
- **Data is collected and transmitted by the Node MCU.**
- **AI processes the data to identify breaks or damages.**
- **Alerts are sent to the railway web server and the nearest control room.**



# Energy Conversion

## Sound to Energy:

- Utilizing ambient sound from railway operations.
- Converting sound energy into electrical energy using specialized sensors.
- Using the generated energy to power the system operations.



# Conclusion

## Summary:

**This project prevent train accident and save many people lives and it**

**Detect cracks in track and inform to control rooms near It happens .**

- AI-based solution for proactive railway safety.**
- Innovative use of sound energy for efficient operations.**
- Significant positive impact on overall railway safety, efficiency, and track management.**
- Dedicated to improving public safety and reducing accidents and losses of lives.**



A close-up, low-angle shot of a woman's face, looking directly at the camera. She is wearing a futuristic headset with a microphone and a small display. The image has a dark, moody aesthetic with a blue and purple color palette. The text 'Future Directions' is overlaid in white, sans-serif font.

# Future Directions

- If somebody will we stealing something then there image will be uploaded to the railway website.



The background of the slide features a dark, semi-transparent image of Iron Man in a dynamic pose, with his right arm extended forward. The image is set against a dark blue gradient background. In the top-left and bottom-right corners, there are decorative teal-colored geometric patterns consisting of parallel lines and rectangles.

# Thank You!



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